

ENHANCING USER ACCEPTANCE OF FEEDBACK IN REPUTATION  
SYSTEMS USING SOCIAL FACTORS

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To all my beloved family members;  
my adorable parents, my lovely husband and  
my kind brother

.

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## ABSTRACT

In e-commerce, reputation systems are created as decision making tools that work via gathering reputation information of online sellers, products or services meant for distribution to interested parties. One of the challenges of the current reputation systems is generating trustworthy feedback to overcome fake and inaccurate submitted feedback as this may mislead the feedback receiver in the process of decision making for shopping online. This research used a social approach to investigate the influence of social factors on acceptance of feedback in the reputation systems and how social relationship indicators can be utilized in these systems. A research model was developed based on three main factors comprising homophily, tie strength and source credibility. Seven hypotheses were developed to test the model. A survey was conducted to evaluate the effect of the proposed social factors to improve feedback acceptance in reputation systems. Data analysis and model testing were operated using Structural Equation Modelling (SEM) with Partial Least Squares (PLS) technique. Then, the proposed model was used to develop the design principles for a social reputation system based on Information Systems Design Theory (ISDT). The results indicated that acceptance of feedback was significantly affected by cognitive and demographic homophily. In addition, expertise and trustworthiness with reference to source credibility had positive influence on the acceptance of feedback. Besides that, based on the three dimensions of the tie strength, closeness of relationship was significant whereas the frequency of interaction and duration of relationship were not significant. In general, the findings of this study supported the proposed theoretical model by emphasizing the role of social relationship of source and recipient on acceptance of feedback to assist users to access trustworthy feedback in reputation systems.

## ABSTRAK

Pembangunan sistem reputasi dalam bidang e-dagang menghasilkan alat bantu yang berperanan mengumpul maklumat peniaga-peniaga atas talian, maklumat produk atau perkhidmatan serta menyebarkannya kepada pihak-pihak yang berminat. Salah satu cabaran terkini kepada sistem reputasi ialah menjana maklum balas yang boleh dipercayai untuk mengatasi maklum balas palsu dan tidak tepat yang dipaparkan kerana ini boleh mengelirukan penerima maklum balas dalam proses membuat keputusan untuk melakukan pembelian secara atas talian. Penyelidikan ini menerapkan pendekatan sosial untuk menyelidiki pengaruh faktor-faktor sosial terhadap penerimaan maklum balas tentang sistem reputasi dan cara petunjuk-petunjuk perhubungan sosial boleh dipakai dalam sistem-sistem tersebut. Penyelidikan ini membangunkan sebuah model berdasarkan kepada tiga faktor utama, iaitu homofili, keakraban perhubungan dan kebolehpercayaan sumber. Tujuh hipotesis telah dibentuk untuk menguji model yang dibangunkan. Soal selidik telah diedarkan untuk mengkaji keberkesanan faktor-faktor sosial yang dicadangkan kepada penambahbaikan penerimaan maklum balas sistem-sistem reputasi. Penganalisisan data dan pengujian model menggunakan teknik "*Structural Equation Modelling*" (SEM) dan "*Partial Least Squares*" (PLS). Model yang dicadangkan telah digunakan untuk membangunkan prinsip-prinsip reka bentuk sebuah sistem reputasi yang berteraskan teori reka bentuk sistem maklumat. Hasil penyelidikan ini menunjukkan bahawa penerimaan maklum balas terjejas oleh homofili kognitif dan demografik secara signifikan. Di samping itu kepakaran dan kebolehpercayaan dengan rujukan kepada sumber yang berkredibiliti mempunyai pengaruh yang positif terhadap penerimaan maklum balas. Selain itu berdasarkan kekuatan sokongan tiga dimensi keakraban perhubungan mempunyai pengaruh yang signifikan sementara kekerapan dan tempoh masa dalam perhubungan tidak mempunyai pengaruh yang signifikan. Secara umumnya, dapatan daripada penyelidikan ini menyokong model teoretikal yang dicadangkan dengan menekankan peranan sumber perhubungan sosial untuk penerimaan maklum balas yang boleh dipercayai dalam sebuah sistem reputasi.

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## **CHAPTER 1**

### **INTRODUCTION**

#### **1.1 Overview**

In this chapter, an introduction to this research is provided. The background of this study is summarized aimed to conducting to the problem statement and objectives of this thesis. Furthermore, in this chapter the scope and significance of this study are described. At the end of this chapter an organization of this thesis is presented.

#### **1.2 Background of Study**

The emergence of electronic commerce (e-commerce) and other types of online trading communities are changing the rules of doing business in many aspects. E-commerce promises substantial gains in productivity and efficiency by bringing together a much larger set of buyers and sellers, and substantially reducing search and transaction costs (Lin & Jin-Nan, 2010). Although e-commerce has a continuous growth, the rate of growth is still slow. Lack of trust has been mentioned as one of the major reasons for customer's avoidance to shop online (Pourshahid & Tran, 2007; Sivaji, Downe, Mazlan, Shi-Tzuaan, & Abdullah, 2011). In the e-commerce environment, which does not require the physical presence of the participants, there is a high level of 'uncertainty' regarding the reliability of the services, products or providers. Thus, decisions regarding whom to trust and with

whom to engage in a transaction become more difficult and fall on the shoulders of individuals (Hyoung Yong, Hyunchul, & Ingoo, 2006).

Meanwhile, there is “information overload” in e-commerce environment. Consumers have to spend more and more time browsing web pages in order to find the proper online stores and products (Yongbo & Ruili, 2012; Yuying & Gaohui, 2007). Overloaded with information, it becomes crucial to help customers to make easy and correct decisions by establishing mechanisms that facilitate evaluation of the available information on different products and sellers available online. Different trust building mechanism is used to overcome the uncertainty related to online purchase transactions (Shin & Shin, 2011). Online sellers have used different strategies such as company contact details, privacy policy, encryption method, and third parties, to show and confirm their trustworthiness to customers. One solution for the uncertainty that exists in e-commerce transactions is the use of reputation systems to assist consumers in distinguishing between low-quality and high-quality products or e-sellers (Fuller, Serva, & Benamati, 2007).

In this study, reputation systems as a trust building mechanism in e-commerce have been chosen as a focus of this study. The basic idea of reputation systems is to let parties rate each other, for example after the completion of a transaction, and use the aggregated ratings about a given party to derive its reputation score (Jøsang, Ismail, & Boyd, 2007). Users using reputation systems are interested in knowing the quality of goods and services and their providers via the feedback of other users (Gregg & Scott, 2006; Resnick, Zeckhauser, Friedman, & Kuwabara, 2000). The feedback systems of eBay.com and Amazon.com’s are examples of online reputation systems which exist in e-commerce currently. In eBay, feedback from buyers is categorized as positive (1), neutral (0), or negative (-1) and includes a short comment. The system aggregates the reviews of each user by summing all of his/her received ratings, and highlights the results on the user’s profile page (Gregg & Scott, 2006).

The effect of reputation information on trust formation has been examined across several decades and in different streams of research (Yao, Ruohomaa, & Xu,



2012). Existing literature has emphasized the importance of feedback in the Internet environment and current studies have shown that increasing numbers of people are using customer feedback in their buying decisions (Ba & Pavlou, 2002; Liu, 2011; Pavlou, 2004).

### **1.3 Problem Statement**

Research on reputation systems has shown that these systems can potentially play an important role in e-commerce as trust building mechanisms used by consumers and as an effective tool for marketing purposes for e-sellers (Gregg & Scott, 2006; Jøsang, 2012; Resnick, et al., 2000). Despite the rapidly growing popularity of reputation systems and their potential benefits, they are still far from being perfect and they face many challenges (Cheung, Luo, Sia, & Chen, 2009; Huang & Yen, 2012). Challenges such as unfair ratings that refer to ratings that do not correctly reflect the actual experience, review spam problem which refers to false reviews that is often in conjunction with unfair ratings, discrimination in providing different quality services to specific relying ratings, multiple offerings of the same service in order to obscure competing services, taking new identity in order to eliminate bad reputation of old identity or taking on multiple identities in order to generate ratings and review spam (Jøsang, 2012).

The disembodied nature of online environments introduces several challenges related to the interpretation and the use of online feedback. Some of these challenges have their roots in the subjective nature of feedback information. Brick-and-mortar or traditional seller settings usually provide a wealth of contextual cues that assist in the proper interpretation of opinions such as familiarity with the person who acts as the source of that information. These cues refer to the ability to draw inferences from the source's facial expression or mode of dress. Most of these cues are absent from online settings. Readers of online feedback are thus faced with the task of evaluating the opinions of strangers because they are interacting to each other

in virtual environment (Cho, Kwon, & Park, 2009; Dellarocas, 2003; Yao, et al., 2012).

One of the important challenges of reputation systems is generating trustworthy feedback, which refers to the existence of fake and inaccurate ratings and feedback that may mislead the feedback receiver (Josang, Roslan, & Boyd, 2007). This vulnerability, results from openness of reputation systems, so that anyone with fake identity or pseudo identity can join these systems and submit his rating and feedback, and this makes the quality of feedback questionable (Yao, et al., 2012). In current reputation systems there is a huge amount of information in the form of feedback exchanged between the submitter and receiver of feedback, who are strangers to each other. Except the limited information provided in the form of created ID and profile of users, no other cues are available regarding the degree of strength of ties and competency of these involved parties in reputation systems.

As feedback is submitted via unlimited number of unknown participants and the information in most reputation systems is unfiltered, this makes the validity of information uncertain, and sometimes it is difficult or even impossible to validate or authenticate the information received in the form of feedback (Dellarocas, 2003; Huang & Yen, 2012). To reduce fake and unfair feedback in reputation systems, one approach is creating trust network among users. In this approach the explicit trust relationship of users in reputation systems is used to give more priority and weight to more trusted feedback (J. Golbeck & J. Hendler, 2006; Guha, Kumar, Raghavan, & Tomkins, 2004). In this approach, users are required to explicitly define their relationships and their trust to other users. Except some reputation systems that employed the mechanism on rating the reviews as “helpful” or creating “web of trust” among users of reputations systems, there is not a comprehensive and robust mechanism to filter the more trustworthy sources of information in reputations systems. The main limitation of trust network approaches, besides requiring users to spend more time explicitly defining their online relationships, is that users often may have only a few links, resulting in insufficient data for improving feedback quality in reputation systems.

Many technical studies have also previously tried to reduce the problem of fake and manipulated feedback or rating (Gilbert & Karahalios, 2010; Withby, Jøsang, & Indulska, 2005; Wu, Greene, Smyth, & Cunningham, 2010). Unfortunately, there are still weaknesses in increasing the robustness of reputation systems and the present trustworthiness of feedback in reputation systems is questionable (Jøsang., 2012). It is important to go beyond technical aspects for improving the reputation systems and solving vulnerabilities. As alternative to technical robustness mechanisms for reputation systems, it can be useful to improve the performance of reputation systems by studying more in depth into the use of behavioral theories, in the argument that they may be able to solve some of the problems of reputation systems.

To improve trustworthiness of feedback in reputation systems, one solution is to authenticate the feedback submitter based on the existed social ties. However in current reputation systems the information on trustworthiness of feedback submitters is not revealed. While a feedback submitter from the social community of feedback receiver maybe a trusted friend and submitted his review and rating in reputation systems, the feedback receiver in current online reputation systems can't distinguish his trustworthy feedback among other submitted feedback and reviews from friends have the same low trustworthiness level as those from unknown people.

Although, there are many benefits from utilizing social interaction of users in improving reputations systems, there is lack of studies establishing the users' social interaction information in reputation systems. Therefore in response to the limitations on investigating the benefits of social relationship information to support reputation systems, it is the motivation in this research to suggest a social approach utilizing the additional indicators of online social relationships of users in reputation systems to increase the perceived trustworthiness of feedback. In other words, the main concern of this research is: "what types of social relationships indicators have a positive effect on users' acceptance of feedback in reputation systems?" The proposed theoretical model in this research expects to lead to more trustworthy

information in reputation systems by emphasizing the use of social relation indicators of feedback submitter and receiver in reputation systems. One of the opportunities to support and apply this approach is existence of online social network, which are rich source of individual's social relation information.

#### 1.4 Research Questions

To date, there has been lack of research conducted to investigate role of social relation in reputation systems. Based on this issue, the main concern of this research is to examine: **“How social relationship information can contribute to the acceptance of feedback in reputation systems?”**

To respond to the main question, the following research questions are therefore addressed:

- i. What social factors can affect users' acceptance of feedback in reputation systems?
- ii. What types of social relation information are most effective on the acceptance of feedback in reputation systems from users' perspective?
- iii. How social relation indicators can be utilized in reputation systems?

## **1.5 Research Objectives**

The objectives of this research are as follows:

- i. To propose a model of acceptance of feedback in reputation systems associating the social relations indicators of participants.
- ii. To examine what social relation factors are most effective on user's acceptance of feedback in reputation systems.
- iii. To develop the guidelines for designing a social reputation system.

## **1.6 Scope of Study**

The researcher acknowledges that reputation systems can be improved in different ways, and in this research, the researcher is not looking to provide enhancement in all aspects of a reputation system and produce an optimal system. However, the researcher is interested in exploring and including one dimension that involves social interaction links between the feedback receiver and submitter to improve the trustworthiness of feedback in reputation systems. Therefore this research develops a theoretical model for reputation system in e-commerce based on social relations. The proposed model is evaluated by conducting a survey. This study targets students within Universiti Teknologi Malaysia (UTM) in Malaysia as potential reputation system users for answering the questionnaire. Students have the characteristics that make them qualified to participate in this research. The reason why this research used students as sample is discussed in chapter 3, under sampling section. This study focuses on online shoppers experience in using feedback

mechanisms. This research considers online shoppers perspective in trustworthiness of feedback in reputation systems by involving additional social relation information.

## **1.7 Significance of Study**

Recognition of the importance of reputation systems has been found in the previous literature. Online reputation systems have become an important component of online shopping because they help to elicit trust from buyers and ensure seller's honesty to some extent (Josang, et al., 2007). As far as sellers with a low reputation are concerned, their past experience of failure in delivering products or services properly will influence buyers to avoid choosing them as trade partner (Dellarocas, 2003). Current studies have shown that increasing numbers of people are using customer feedback in their buying decisions (Fang & Yasuda, 2009; Ling Liu 2012).

The effect of reputation information on trust formation has been examined across several decades and in different streams of research (Ba & Pavlou, 2002; Pavlou, 2004; Zucker, 1986). Currently many buyers have formed the habit of reviewing seller's reputation before making purchase decisions. Existing literature has emphasized the importance of feedback in the Internet environment (Dellarocas, 2003; Fuller, et al., 2007; Resnick, et al., 2000). Thus, reputation is a crucial clue to judge whether the seller is trustworthy or not. Prior research fully represent the positive effect and importance of reputation systems 'in online shopping web sites, including building trust, increasing profit and making the whole transaction process more efficient (Gutowska, 2009; Huang & Davison, 2009).

This study contributes to literature in several ways. First, as theoretical contribution, this research enhances the literature on reputation systems by investigating the effect of social factors in reputation system. The related behavioral theories in the context of reputation systems are applied; this research suggests benefiting from social theories. Based on the related kernel theories, a theoretical model is developed that propose social factors that is expected to improve performance of reputation systems by increasing the trustworthiness of feedback

which result in adoption of feedback in reputation systems. This thesis also applied the ISDT framework, as design science theory for developing design principles for social reputations system. As practical contribution, the result of this study offers insights to e-sellers, researchers and managers about the role and potentials of social relation information to support reputation system. From business perspective, new reputation system based on ISDT framework for social reputation systems can be used as a strong marketing tool and from user perspective it provides users a more reliable decision making tool in differentiating between high and low quality e-sellers, products or services in e-commerce environment.

## 1.8 Organization of Thesis

This thesis is organized into 7 chapters, as shown in Table 1.1:

**Table 1.1:** Organization of thesis

Section	Description
Chapter 1 Introduction	Chapter 1 introduces the reader to the concern and purpose of this study
Chapter 2 Literature review	Chapter 2 includes the review of related work in previous researches and an analysis on them
Chapter 3 Research methodology	Chapter 3 describes the methodology, methods, and instrument development in conducting this research
Chapter 4 Development of model	Chapter 4 introduces the social approach for reputation systems and develop this research model and its hypotheses
Chapter 5 Survey Data analysis	Chapter 5 describes the analysis of data in related software tool and presents the structural model
Chapter 6 Design principles for social reputation system	Chapter 6 describes the ISDT and its applicability in this research in creating the framework for design principles of a social reputation system
Chapter 7 Discussion and conclusion	Chapter 7 concludes this research by discussing the findings, and presenting the research implications

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